Application No. 10/024,272
Filed: December 18, 2001
TC Art Unit: 1762
Confirmation No.: 4935

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A method of densifying hollow bowl-shaped porous substrates ~~of hollow shape~~ by chemical vapor infiltration, the substrates each having an inside volume defined by a concave inside face and having an opposite convex outside face, the method comprising the steps of:

placing at least one hollow substrate to be ~~densifyied~~ densified in an enclosure;

admitting a reactive gas into the enclosure through a gas inlet opening into the enclosure at one end thereof;

causing the gas to flow through the enclosure between said reactive gas inlet and an effluent gas outlet at another end of the enclosure;

dividing at least a portion of the reactive gas flow entering the enclosure into first and second non-zero fractions, wherein the first fraction of the reactive gas flow is fed to the inside face of the at least one substrate and the second fraction of the reactive gas flow is fed to only the ~~second~~ outside face of the at least one substrate; and

guiding the first fraction of the reactive gas flow feeding the inside face of the at least one substrate by means of a tooling directing the gas into the inside volume of the substrate

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so that the concave inside face of the substrate is swept in full by the first fraction of the total reactive gas flow admitted into the enclosure.

2. (Canceled)

3. (Previously Presented) A method according to claim 1, wherein the fraction of the total reactive gas flow sweeping over a face of said at least one substrate placed in the enclosure is not less than 5%.

4. (Previously Presented) A method according to claim 1, wherein the fraction of the total reactive gas flow sweeping over a face of said at least one substrate placed in the enclosure is not less than 10%.

5. (Previously Presented) A method according to claim 1, wherein a plurality of substrates are densified simultaneously, the substrates being placed inside the enclosure in alignment in the general flow direction of the gas through the enclosure.

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6. (Previously Presented) A method according to claim 1, wherein said guidance of a portion of the gas flow is provided by a wall portion which penetrates into the volume defined by the concave inside face of said at least one substrate.

7. (Previously Presented) A method according to claim 6, wherein said portion of the gas flow is guided in part by a cylindrical wall portion to the vicinity of an end wall of the inside volume of said at least one substrate.

8. (Previously Presented) A method according to claim 1, wherein the guidance of a portion of the gas flow is provided by passages formed through a body housed inside the volume defined by the concave inside face of said at least one substrate.

9. (Withdrawn) An installation for densifying hollow-shaped porous substrate by chemical vapor infiltration, the installation comprising an enclosure having a side wall and first and second end walls opposite each other, means for admitting a reactive gas opening out into the enclosure through the first end wall, means for evacuating effluent gas opening out into the enclosure through the second end wall, and at least one tray for supporting a

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substrate to be densified, the installation being characterized in that it further comprises means for distributing and guiding the gas flow so as to bring a fraction of the admitted reactive gas flow to the location of each substrate within the enclosure and so as to guide a portion of the gas flow brought to said location to the inside of a volume defined by a concave inside face of a substrate disposed at said location.

10. (Withdrawn) An installation according to claim 9, characterized in that the flow guide means comprise guide tooling constituted by a cylindrical wall portion disposed in such a manner as to penetrate at least in part into said substrate volume.

11. (Withdrawn) An installation according to claim 9, characterized in that the flow guide means comprise guide tooling constituted by a body presenting a plurality of through passages and disposed in such a manner as to penetrate at least in part into said substrate volume.

12. (Withdrawn) An installation according to claim 9, characterized in that the flow distribution means comprise one or

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more trays which are disposed transversely inside the enclosure and which define flow-distributing passages formed by openings made through the trays and by gaps left between the trays and a side wall of the enclosure.

13. (Previously Presented) A method according to claim 5, wherein the fraction of the total reactive gas flow sweeping over a face of each substrate placed in the enclosure is not less than 5%.

14. (Previously Presented) A method according to claim 5, wherein the fraction of the total reactive gas flow sweeping over a face of each substrate placed in the enclosure is not less than 10%.

15. (Previously Presented) A method according to claim 6, wherein a plurality of substrates are densified simultaneously, the substrates being placed inside the enclosure in alignment in the general flow direction of the gas through the enclosure.

16. (Previously Presented) A method according to claim 7, wherein a plurality of substrates are densified simultaneously, the substrates being placed inside the enclosure in alignment in the general flow direction of the gas through the enclosure.

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17. (Previously Presented) A method according to claim 4, characterized in that a plurality of substrates are densified simultaneously, the substrates being placed inside the enclosure in alignment in the general flow direction of the gas through the enclosure.

18. (Withdrawn) An installation according to claim 10, characterized in that the flow distribution means comprise one or more trays which are disposed transversely inside the enclosure and which define flow-distributing passages formed by openings made through the trays and by gaps left between the trays and a side wall of the enclosure.

19. (Withdrawn) An installation according to claim 11, characterized in that the flow distribution means comprise one or more trays which are disposed transversely inside the enclosure and which define flow-distributing passages formed by openings made through the trays and by gaps left between the trays and a side wall of the enclosure.

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20. (Previously Presented) A method according to claim 1, wherein:

a plurality of substrates are densified simultaneously, the substrates being placed inside the enclosure in alignment in the general flow direction of the gas through the enclosure;

the fraction of the total reactive gas flow sweeping over a face of each substrate placed in the enclosure is not less than 5%;

the guidance of a portion of the gas flow is provided at least in part by a cylindrical wall portion which penetrates into the volume defined by the concave inside face of the or each substrate, to the vicinity of the end wall of the or each substrate.

21. (Previously Presented) A method according to claim 1, wherein:

a plurality of substrates are densified simultaneously, the substrates being placed inside the enclosure in alignment in the general flow direction of the gas through the enclosure;

the fraction of the total reactive gas flow sweeping over a face of each substrate placed in the enclosure is not less than 5%;

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the guidance of a portion of the gas flow is provided by passages formed through a body housed inside the volume defined by the concave inside face of each substrate.

22. (Currently Amended) A method of densifying a hollow bowl-shaped porous substrate ~~of hollow shape~~ by chemical vapor infiltration, the substrate having a concave inside face, an opposite convex outside face and an edge defining an opening for accessing an inside volume defined by the concave inside face, the method comprising:

placing the hollow substrate to be ~~densifyied~~ densified in an enclosure;

admitting a reactive gas into the enclosure through a gas inlet opening into the enclosure;

causing the gas to flow through the enclosure between said gas inlet and an effluent gas outlet;

directing a first non-zero portion, but not all, of the reactive gas flowing through the enclosure into the inside volume of the substrate by means of a tooling extending into the inside volume of the substrate, wherein the concave inside face of the substrate is swept in full by the first portion of the reactive gas flow; and

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feeding a second non-zero portion of the reactive gas flowing through the enclosure to the ~~second~~ outside face of the substrate.

23. (Currently Amended) A method according to claim 22, further comprising:

placing at least one other hollow substrate to be ~~the densifyied~~ densified in the enclosure;

for each of the other hollow substrates, directing a respective first non-zero portion, but not all, of the reactive gas flowing through the enclosure into the inside volume of the other substrate, wherein the concave inside face of the other substrate is swept in full by the respective first fraction of the reactive gas flow; and

feeding a respective second non-zero portion of the reactive gas flowing through the enclosure to the ~~second~~ outside face of the other substrate.

24. (New) A method according to claim 22, wherein feeding the second non-zero portion of the reactive gas comprises feeding the second non-zero portion of the reactive gas to only the outside face of the substrate.

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25. (New) A method according to claim 23, wherein feeding the second non-zero portion of the reactive gas comprises feeding the second non-zero portion of the reactive gas to only the outside face of the substrate.

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